



US009411052B2

(12) **United States Patent**
Lennen et al.

(10) **Patent No.:** **US 9,411,052 B2**
(45) **Date of Patent:** ***Aug. 9, 2016**

(54) **SYSTEM, METHOD, AND APPARATUS FOR MINIMIZING POWER CONSUMPTION IN A PORTABLE DEVICE CAPABLE OF RECEIVING SATELLITE NAVIGATIONAL SYSTEM SIGNALS**

(58) **Field of Classification Search**
CPC combination set(s) only.
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

(71) Applicant: **Samsung Electronics Co., Ltd.**,
Gyeonggi-do (KR)

7,359,713	B1	4/2008	Tiwari
8,072,379	B2	12/2011	Gopinath
8,228,234	B2	7/2012	Paulson et al.
8,990,009	B2 *	3/2015	Lennen G01S 19/34 340/7.32

(72) Inventors: **Gary Lennen**, Cupertino, CA (US);
Andy Milota, Cedar Rapids, IA (US)

(73) Assignee: **Samsung Electronics Co., Ltd** (KR)

2008/0231449	A1	9/2008	Moshfeghi
2009/0043491	A1	2/2009	Haatainen
2011/0309976	A1	12/2011	Leclercq et al.
2013/0120116	A1	5/2013	Moshfeghi
2013/0120118	A1	5/2013	Moshfeghi

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

This patent is subject to a terminal disclaimer.

FOREIGN PATENT DOCUMENTS

WO WO 2011/079870 7/2011

* cited by examiner

(21) Appl. No.: **14/664,035**

(22) Filed: **Mar. 20, 2015**

Primary Examiner — Yonel Beaulieu

(74) *Attorney, Agent, or Firm* — The Farrell Law Firm, P.C.

(65) **Prior Publication Data**

US 2015/0234054 A1 Aug. 20, 2015

(57) **ABSTRACT**

Methods, systems, and portable devices which reduce the power used by a portable device to receive/process satellite navigational system signals and/or to compute the portable device's position using satellite navigational system signals are described. One portable device retrieves power usage information corresponding to its current location, where the power usage information is based on aggregate data from portable devices which have traversed and/or are traversing the current location. The portable device then selects a power saving mode from a plurality of power saving modes based on the retrieved power usage information, where each power saving mode reduces power usage in one or more of receiving and/or processing satellite navigational system signals, and/or computing the portable device's position using the satellite navigational system signals.

Related U.S. Application Data

(63) Continuation of application No. 14/048,657, filed on Oct. 8, 2013, now Pat. No. 8,990,009.

(60) Provisional application No. 61/857,928, filed on Jul. 24, 2013.

(51) **Int. Cl.**

G01C 21/00 (2006.01)

G01C 21/26 (2006.01)

G01S 19/34 (2010.01)

(52) **U.S. Cl.**

CPC **G01S 19/34** (2013.01)

21 Claims, 6 Drawing Sheets

